

## Reflection Cowl for a Bar-Code Scanner

### BACKGROUND OF THE INVENTION

#### 1) FIELD OF THE INVENTION

5 The present invention relates to a reflection cowl for a bar-code scanner, more especially, a bar-code scanner capable of not only obtaining a transversely linear scanning light ray with evenly left and right as well as better light ray intensity, but also saving the electric source and reducing the manufacturing cost.

#### 10 2) DESCRIPTION OF THE PRIOR ART

Accordingly, all the hand-held scanner of the prior art comprises of a light source, a convex light stick, a lens, a sensor element and a circuit board; the light ray reflected for scanning has to be transverse linear light band for efficiently and precisely reflecting the image of the transverse bar-code to a 15 sensor element for accomplishing the objective of reading the data. In order to obtain a transverse light band with consistent brightness at every position, usually more than two light sources are arranged in the rear aspect of the convex light stick for direct reflection; however, since this kind of structure has more than two luminous element of light-emitting diode (LED), it naturally 20 increases the parts cost and electricity consumption; in addition, it tends to

cause the problem of having uneven brightness on the left or the right portions, or in the central joint area of the light rays; that further influences the quality and economy of the product and really needs to be improved.

The inventor of the present invention, addressed the shortcomings of the 5 abovementioned hand-held scanner of the prior art requiring more LED luminous elements, wasting the electric source, increasing the cost, the uneven intensity of the various portions of the light band, researched and developed discreetly as well as based on the experience gained from engaging in this industrial field for many years, finally invented a reflection cowl for bar-code 10 scanner.

## **SUMMARY OF THE INVENTION**

Therefore, the primary objective of the present invention is to provide a reflection cowl for a bar-code scanner to be disposed in the rear aspect of a light-emitting diode (LED) luminous element for reflecting two strands of light 15 sources reflected through the convex light stick from the two sides of the said LED luminous element; additionally, the said distribution function of the reflected light distribute the reflected light source evenly on the convex light stick for further obtaining the best reflective effect of the transverse light band.

For achieving the above objectives, the present invention of a reflection 20 cowl for a bar-code scanner comprises at least a light source, a convex light

stick, a lens, a sensor element and a circuit board; the feature thereof is that the light source wherein is a luminous element of mono light-emitting diode (LED) with a reflection cowl disposed in the rear aspect thereof; the said reflection cowl is divided by the center line passed through the light source into a left and 5 a right portions of reflection curved surfaces; respectively, the left and the right portions of the curved surfaces have a plurality of concaved reflection spherical surfaces; all the said reflection spherical surfaces have the function of distributing the light so as to make all the light rays reflected back from all the reflection spherical surfaces fall evenly on the convex light stick, thereby 10 adjusting the curvature of the reflection cowl further adjusts the left and the right distribution areas of the reflected light, that means, evenly distributes the brightness at the center and on the side rim thereof.

Accordingly, the present invention has a LED luminous element disposed at the center in the rear aspect of the convex light stick to shine onto 15 the reflection curved surfaces on the left and right portions of the reflection cowl; then a plurality of reflection spherical surfaces reflect evenly to the convex light stick for preventing the problem of having different brightness on the left and the right side rims and to reduce the problem of having uneven brightness of the light rays at the central joint area caused by the light source 20 accomplished by more than two LED luminous elements and to save more

electricity than the structure with multiple LED luminous elements of the prior art.

In order to enable a further understanding of the mentioned structure and effectiveness of the present invention, the brief description of the drawings below is followed by the detailed description of the preferred embodiment.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a schematic drawing of an entire scanner.

Figure 2 is a top view drawing of an exemplary embodiment of a reflection cowl of the present invention.

Figure 3 is a lateral view drawing of an exemplary embodiment of a reflection cowl of the present invention.

Figure 4 is a pictorial drawing of the reflection cowl of the present invention.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Referring to FIG. 1, the present invention of a reflection cowl for a barcode scanner at least comprises a light source (10), a convex light stick (20), a lens (30), a sensor element (40) and a circuit board (50); when the scanning work is activated, the light source (10) emits the light rays, after being condensed by the convex light stick (20), a transversely long light band is formed; when the said light band shines on a bar-code label (60), the image of

the said bar-code label (60) projects onto a sensor element (40) directly (or indirectly through a reflection mirror) through a lens (30) (including a fringe); the light signal, after being read and converted into digital signal by a sensor element (40), is transmitted outward through a circuit board (50) for use or for 5 storage.

Referring to FIGS 2 and 3, the light source (10) of the present invention is a mono LED luminous element shining rearward; a reflection cowl (70) is disposed in the rear aspect of the said light source (10); the said reflection cowl (70) is divided by the center line passed through the light source (10) into a left 10 and a right portions of reflection curved surfaces (71); respectively, the left and the right portions of the curved surfaces (71) have a plurality of concaved reflection spherical surfaces (72) thereon, as shown in FIG. 4; all the said reflection spherical surfaces (72) have the function of distributing the light so as to make all the light rays reflected back from all the reflection spherical 15 surfaces (72) to fall evenly on the convex light stick (20), as shown in FIG. 2; then the convex light stick (20) condenses the light rays longitudinally, as shown in FIG. 3, to make the projected light beam a transversely long light band parallel to the convex light stick (20).

According to the mentioned structure, through adjusting the curvature of 20 the reflection curved surfaces (71) on the two left and right proportions of the

reflection cowl, the reflected light on every reflection spherical surfaces (72) can be adjusted to distribute evenly on the left and the right sides of the convex light stick (20) for further evenly distributing the brightness at the center and on the side rim thereof to achieve the best projective effect.

5        Accordingly, the light source (10) of the present invention can be obtained by disposing one LED luminous element at the center in the rear aspect to shine backward on to the reflection curved surfaces (71) on the left and the right portions of the reflection cowl (70), then to reflect on to the convex light stick (20) so as to eliminate the problem of having different 10 brightness on the left and the right side rims, to reduce the problem of having uneven brightness of the light rays at the central joint area caused by the light source of multiple LED luminous elements of the prior art and to save more electricity than the prior art of multiple LED luminous elements, thereby to increase the industrial utilization value and practicality of the said product.

15        In summation of the foregoing sections, the present invention of a reflection cowl for a bar-code scanner is capable of specifically achieving the efficiency of saving the electricity, the cost and having an even illumination.

It is of course to be understood that the embodiment described herein is merely illustrative of the principles of the invention and that a wide variety of 20 modifications thereto may be effected by persons skilled in the art without

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